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Abstract of the Disclosure

The present invention is to provide a reactor core that allows a nuclear plant to continuously operate for a long term period, for example 15 years or longer, without requiring any fuel exchange, reduces the duration and number of maintenance steps involved in regular plant inspections, markedly improves plant availability and economic efficiency, and is effective in terms of nuclear nonproliferation.

A plurality of fuel assemblies 103, themselves obtained by arranging fuel rods 100 and water rods 107 in square lattices, are arranged in a square lattice at a certain pitch. The blades 102a of a cross-shaped (cruciform) control rod 102 in a cross section are inserted into four adjacent spaces formed by four fuel assemblies 100 facing each other. A value of 0.06 cm^{-1} or greater is selected for the ratio (B/S) of the width (B) of each blade on the cruciform control rod 102 and the surface (S) of the fuel lattice defined by the surface area of a square whose side is equal to the pitch between the fuel assemblies 103.